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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,640	09/10/2003	Joseph A. MacDougald	JPP-1235DIV-1	5238

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EXAMINER	
STAICOVICI, STEFAN	

ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 07/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,640	MACDOUGALD ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24,26-28 and 37-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24, 26-28 and 37-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 5, 2006 has been entered.

Response to Amendment

2. Applicants' amendment filed June 5, 2006 has been entered. Claims 24, 26-28 and 37-42 are pending in the instant application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 24, 26, 28, 37-38 and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danforth *et al.* (US Patent No. 5,900,207) in view of Brodkin *et al.* (US Patent No. 6,322,728 B1).

Danforth *et al.* ('207) teach the basic claimed process for making a 3-dimensional object including, mixing a composition of ceramic particles, binder material and dispersant agent, forming said mixture into a filament (feedstock), heating said filament (feedstock) to a molten state, dispensing said molten filament (feedstock) from a dispensing apparatus onto a platform to form a first layer, solidifying said first layer (curing) and dispensing subsequent layers to form said 3-dimensional object (see col. 2, line 58 through col. 3, line 43).

Regarding claim 24, although Danforth *et al.* ('207) teach a wide variety of 3-dimensional objects, Danforth *et al.* ('207) do not teach a dental material. Brodkin *et al.* ('728) teach a process for making a dental material including, providing a ceramic and binder mixture, forming said mixture into a feedstock and molding said feedstock into a dental material using a fused deposition modeling process (see col. 9, lines 15-30). It is noted that the process of Danforth *et al.* ('207) is a fused deposition modeling process. Therefore, it would have been obvious for one of ordinary skill in the art to make a dental material as taught by Brodkin *et al.* ('728) using the process of Danforth *et al.* ('207) because, Danforth *et al.* ('207) teach a wide variety of 3-dimensional objects that can be made using an efficient process and also because, Brodkin *et al.* ('728) teach a fused deposition modeling process, hence suggesting the process of Danforth *et al.* ('207), which is a fused deposition modeling process.

In regard to claim 26, although Danforth *et al.* ('207) teach ceramic particles, such as oxides, Danforth *et al.* ('207) do not specifically teach alumina particles. Brodkin *et al.* ('728) teach a process for making a dental material including, providing a ceramic particles, such as alumina and zirconia (col. 5, lines 40-43 and col. 9, lines 21-25). Therefore, it would have been

obvious for one of ordinary skill in the art to provide alumina ceramic particles as taught by Brodkin *et al.* ('728) in the process of Danforth *et al.* ('207) because, Brodkin *et al.* ('728) specifically teach that alumina particles to provide for an improved dental material and also because, Danforth *et al.* ('207) specifically teach oxides, hence suggesting the alumina (aluminum oxide) ceramic particles of Brodkin *et al.* ('728).

Specifically regarding claims 28 and 42, Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) teach a 3-dimensional object, specifically a dental material formed by a fused deposition process, wherein said dental material includes, ceramic particles, a binder and a dispersant agent. Further regarding claim 42, because the dental material of Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) has the same composition and is made by the same process as claimed, then it is submitted that said dental material has the same mechanical properties as claimed. It is submitted that the dental material of Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) has mechanical properties of about 15 to about 20% of the mean average standard deviation.

Regarding claim 37, Danforth *et al.* ('207) teach a dispersing agent not based on glycerin (see col. 6, line 27).

In regard to claim 38, Danforth *et al.* ('207) teach the use of nanoscale ceramic powders (see col. 5, line 68 through col. 6, line 16). It is submitted that nanoscale ceramic powders are substantially spherical and substantially uniform particle size (nano-scale).

Regarding claim 40, Danforth *et al.* ('207) teach alternately dispensing different feedstock materials (see col. 4, lines 7-22).

In regard to claim 41, Danforth *et al.* ('207) teach binder burnout and sintering (see col. 14, lines 6-60).

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Danforth *et al.* (US Patent No. 5,900,207) in view of Brodkin *et al.* (US Patent No. 6,322,728 B1) and in further view of Chadwick (US Patent No. 6,063,314).

Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) teach the basic claimed process as described above.

Regarding claim 27, although Danforth *et al.* ('207) teach a binder (media) having a styrene-butadiene copolymer, Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) do not teach that the media (binder) includes a silicone polymer. Chadwick ('314) teaches making a ceramic dental restoration by mixing a ceramic material with a silicone polymer, wherein said silicon polymer is an equivalent alternative to a styrene-butadiene copolymer (see col. 5, lines 13-30). Therefore, it would have been obvious for one of ordinary skill in the art to provide a silicone polymer as taught by Chadwick ('314) as an equivalent alternative to the to the styrene-butadiene copolymer in the binder (media) in the process of Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) because, Chadwick ('314) specifically teaches that when making a ceramic dental restoration which includes a ceramic with a silicone polymer, said silicon polymer is an equivalent alternative to a styrene-butadiene copolymer.

6. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Danforth *et al.* (US Patent No. 5,900,207) in view of Brodkin *et al.* (US Patent No. 6,322,728 B1) and in further view of Crump (US Patent No. 5,121,329).

Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) teach the basic claimed process as described above.

Regarding claim 39, although Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) teach applying multiple layers, Danforth *et al.* ('207) in view of Brodkin *et al.* ('728) do not teach the thickness of these layers. Crump ('329) teaches a fused deposition process including, depositing a plurality of layers, wherein each layer has a thickness of about 0.0001 to 0.125 inches (see col. 3, lines 21-29). Therefore, it would have been obvious for one of ordinary skill in the art to apply a layer having a thickness of about 0.0001 to 0.125 inches as taught by Crump ('329) in the process of Danforth *et al.* ('207) in view of Brodkin *et al.* ('728), because Crump ('329) teaches that thin layers provide for improved surface quality, hence providing for an improved product and also because, all references teach similar materials and processes.

7. Claims 24, 26, 28 and 37-38 and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207).

Brodkin *et al.* ('728) teach the basic claimed process for making a dental material including, providing a ceramic and binder mixture, forming said mixture into a feedstock and molding said feedstock into a dental material using a fused deposition modeling process (see col. 9, lines 15-30).

Regarding claim 24, Brodkin *et al.* ('728) do not teach heating said mixture feedstock, dispensing said mixture from a dispensing apparatus onto a platform to form a first layer, solidifying said first layer and dispensing subsequent layers to form said dental material.

However, such steps are well known in a fused deposition process as evidenced by Danforth *et al.* ('207) who teach a fused deposition process for making a 3-dimensional object including, mixing a composition of ceramic particles, binder material and dispersant agent, forming said mixture into a filament (feedstock), heating said filament (feedstock) to a molten state, dispensing said molten filament (feedstock) from a dispensing apparatus onto a platform to form a first layer, solidifying said first layer (curing) and dispensing subsequent layers to form said 3-dimensional object (see col. 2, line 58 through col. 3, line 43). Therefore, it would have been obvious for one of ordinary skill in the art heat said mixture feedstock, dispense said mixture from a dispensing apparatus onto a platform to form a first layer, solidify said first layer and dispense subsequent layers as taught by Danforth *et al.* ('207) in the fused deposition process of Brodkin *et al.* ('728) because, Danforth *et al.* ('207) teach an efficient process for making 3-dimensional objects and also because, Brodkin *et al.* ('728) specifically teach a fused deposition process, hence suggesting the process steps of the fused deposition process of Danforth *et al.* ('207).

In regard to claim 26, Brodkin *et al.* ('728) teach a process for making a dental material including, providing a ceramic particles, such as alumina and zirconia (col. 5, lines 40-43 and col. 9, lines 21-25).

Specifically regarding claims 28 and 42, Brodkin *et al.* ('728) teach a dental material formed by a fused deposition process, wherein said dental material includes, ceramic particles and a binder. Further regarding claim 42, because the dental material of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) has the same composition and is made by the same process as

claimed, then it is submitted that said dental material has the same mechanical properties as claimed. It is submitted that the dental material of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) has mechanical properties of about 15 to about 20% of the mean average standard deviation.

Regarding claim 37, Brodkin *et al.* ('728) do not teach a dispersing agent not based on glycerin. Danforth *et al.* ('207) teach a dispersing agent not based on glycerin (see col. 6, line 27). It would have been obvious for one of ordinary skill in the art to provide the dispersing agent not based on glycerin of Danforth *et al.* ('207) in the process of Brodkin *et al.* ('728) because, Danforth *et al.* ('207) teach that a dispersant agent provides for an improved mixture and distribution of the ceramic particles, hence providing for an improved product.

In regard to claim 38, Brodkin *et al.* ('728) teach substantially spherical particles. Further, Danforth *et al.* ('207) teach the use of nanoscale ceramic powders (see col. 5, line 68 through col. 6, line 16). It is submitted that nanoscale ceramic powders are substantially spherical and substantially uniform particle size (nano-scale). It would have been obvious for one of ordinary skill in the art to provide substantially spherical and substantially uniform particle size as taught by Danforth *et al.* ('207) in the process of Brodkin *et al.* ('728) because, Danforth *et al.* ('207) teach that substantially spherical and substantially uniform particle size provide for an improved product.

Regarding claim 40, Brodkin *et al.* ('728) do not teach alternately dispensing different feedstock materials. Danforth *et al.* ('207) teach alternately dispensing different feedstock materials (see col. 4, lines 7-22). It would have been obvious for one of ordinary skill in the art to

alternately dispense different feedstock materials as taught by Danforth *et al.* ('207) in the process of Brodkin *et al.* ('728) because, Danforth *et al.* ('207) teach that such a procedure allows for forming 3-dimanesionla objects having varying properties, hence providing for an improved product.

In regard to claim 41, Brodkin *et al.* ('728) teach removing the binder and sintering (see col. 5, lines 27-31 and col. 9, lines 20-21). Danforth *et al.* ('207) teach binder burnout and sintering (see col. 14, lines 6-60).

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207) and in further view of Chadwick (US Patent No. 6,063,314).

Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) teach the basic claimed process as described above.

Regarding claim 27, although Danforth *et al.* ('207) teach a binder (media) having a styrene-butadiene copolymer, Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) do not teach that the media (binder) includes a silicone polymer. Chadwick ('314) teaches making a ceramic dental restoration by mixing a ceramic material with a silicone polymer, wherein said silicon polymer is an equivalent alternative to a styrene-butadiene copolymer (see col. 5, lines 13-30). Therefore, it would have been obvious for one of ordinary skill in the art to provide a silicone polymer as taught by Chadwick ('314) as an equivalent alternative to the to the styrene-butadiene copolymer in the binder (media) in the process of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) because, Chadwick ('314) specifically teaches that when making a ceramic dental

restoration which includes a ceramic with a silicone polymer, said silicon polymer is an equivalent alternative to a styrene-butadiene copolymer.

9. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207) and in further view of Crump (US Patent No. 5,121,329).

Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) teach the basic claimed process as described above.

Regarding claim 39, although Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) teach applying multiple layers, Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) do not teach the thickness of these layers. Crump ('329) teaches a fused deposition process including, depositing a plurality of layers, wherein each layer has a thickness of about 0.0001 to 0.125 inches (see col. 3, lines 21-29). Therefore, it would have been obvious for one of ordinary skill in the art to apply a layer having a thickness of about 0.0001 to 0.125 inches as taught by Crump ('329) in the process of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207), because Crump ('329) teaches that thin layers provide for improved surface quality, hence providing for an improved product and also because, all references teach similar materials and processes.

Response to Arguments

10. Applicants' remarks have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson, can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

Stefan Staicovici 7/26/06

Primary Examiner

AU 1732

July 26, 2006